

The Remote Control for Ham Radio use

Development Plan

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Automaz-Shack-IK5NTH.ppt

Introduction

This work is coming both from my job activity and request/suggestion of Alessandro IK5WJD, which already talked about on the same object (***Remote Ham Radio Station – How to do it ?***).

Using Internet as network connection, there are real possibilities to make some remote controls nearly in real time. The little communication delay due network travel time is acceptable for our use.

Another decisive factor for the realization of this Hardware solution, is based on the availability of little pre-assembled PCB named “Server Embedded” which offer to Ham Radio many programmable resources, with different peculiarity of course, suitable to all kinds of utilization.



The idea

What I want to present you is not innovative, neither from electronic viewpoint nor technical viewpoint. I've only realized a REMOTE CONTROL SYSTEM for Radio Amateur use.

The target of this design consists to let our Ham world in front to the state of art of the newest thecnologies

Therefore this target have to be carefully evaluated.

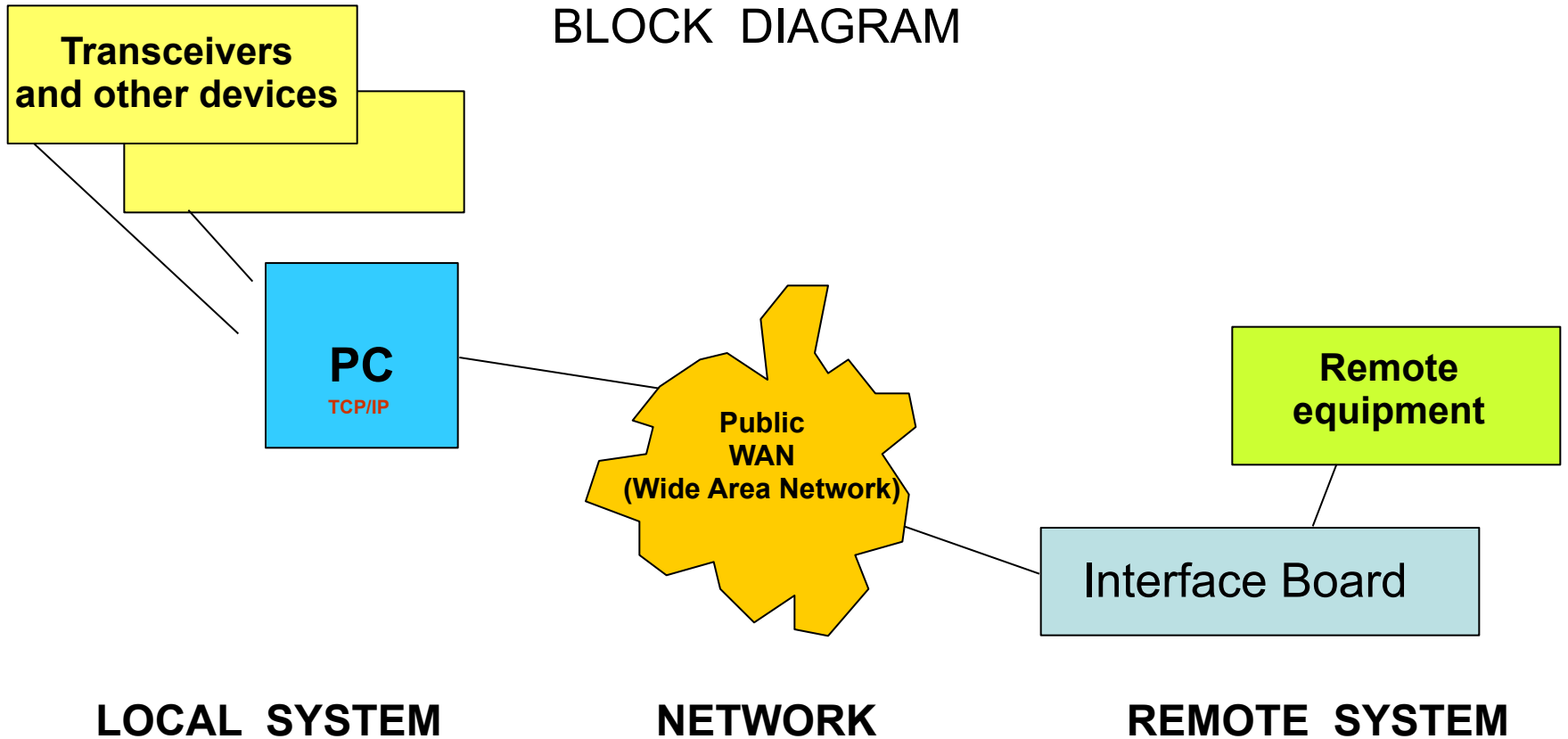
Hardware

The "Remote Controller" is developed upon a PC and consist in three parts:

1. your PC with Internet capability
2. the NETWORK,
3. the REMOTE STATION and everything remote you want to control.



BLOCK DIAGRAM



Hardware

Some particular details of REMOTE SYSTEM are:

- a “Server Embedded” board
- an “Interface” board
- the station and/or equipments object to remote controlling.

The “Server Embedded” board is a device produced from “**TIBBO Technology**”(<http://tibbo.com>); for Italian seller see “Futura Elettronica” (<http://futuranet.it>).

The choice of **TIBBO** board is done due essentially to these factors:

- The cheap price
- Easy availability of options and accessory functions
- Large quantity of I/O gates
- Peripherals and performances included on board
- Facility of programming codes
- Development environment entirely free and downloadable with the use of Internet.



TIBBO board Characteristics

The **TIBBO** board put into himself a very Web-Server able to handshake some IP connections and able to include some Web pages. Another good performance is the ability to customize the internal HTML pages, with the facility to make “dynamics” these pages, by means the Basic programming code !!

This is a “power source” as do it like the answers provided by Web-Server to client are make use of real time computing as a cascable sequence of command, with the decisional facility offer by Basic code - included into HTML pages -.

Some I/O pins are predefined as Outputs which have preassembled some relative relays to decoupling galvanically the board from other external managed services. The internal/external serial port is capable to manage the usual RS-232 port protocol.

With this connection will be possible take maximum advantage of the system, in fact, with simple relays, it will be possible turn-on / turn-off several devices located in the Ham station. It is possible also to develop some sophisticated functions very customized as “ad hoc” and comparable to professional systems.



The TIBBO board



The Remote Control
for
Ham Radio use
IK5NTH - 7

INTERFACE board (Breadboard) Characteristics

The interface board contain the TIBBO board (see the pictures), the Motor Driver Board, a microprocessor of Atmel ATMEGA128 defined the “core” which control by means hers internal I/O ports some peripherals, as a couple of stepper motors, analog sensors....etc.

This interface is designed to drive a couple of stepper motors AZ + EL, very small motors in this case of demo board, but in the future the system will be able to drive a large array or parabolic dish with suitable motors.

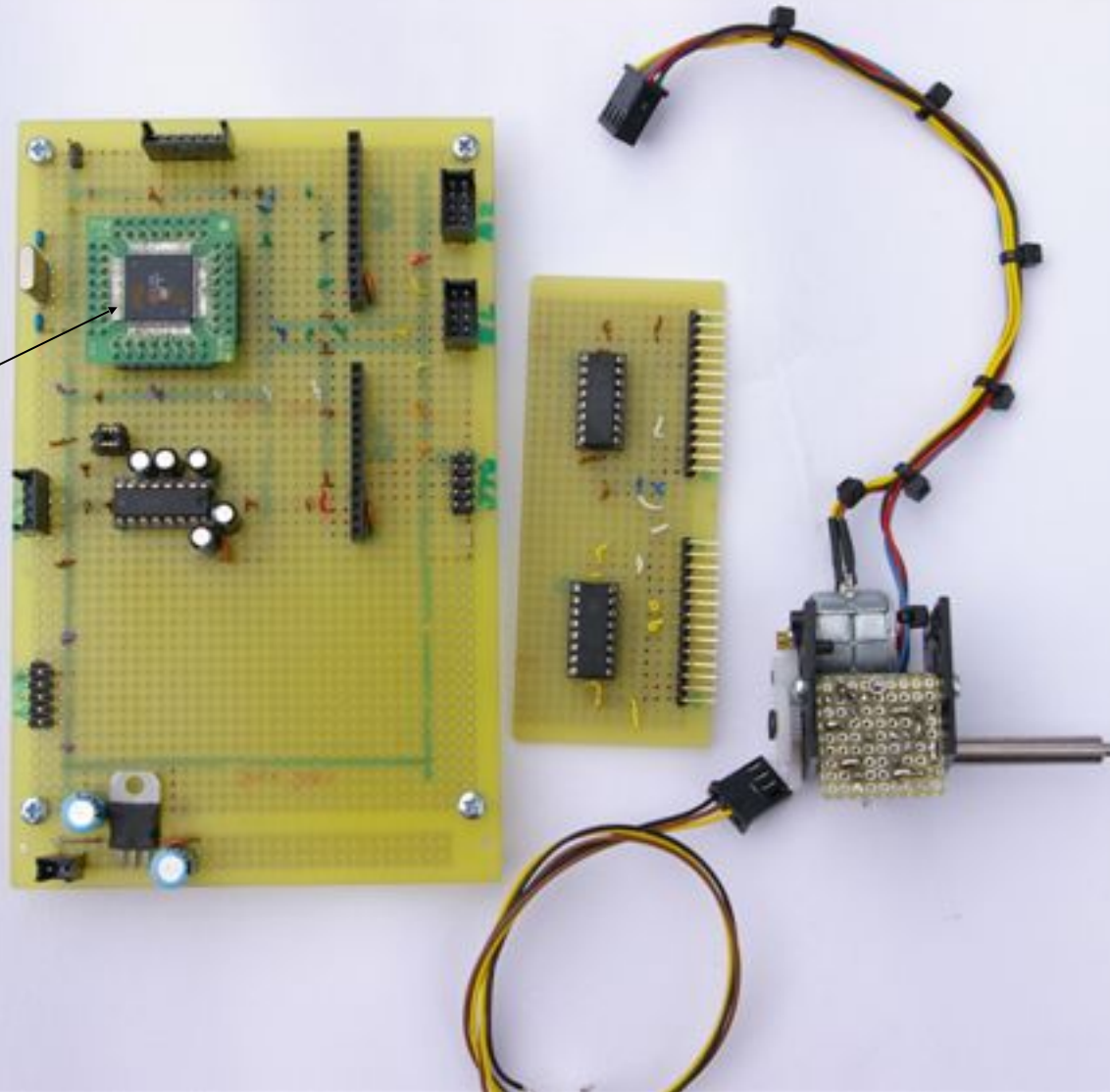
Besides, on the board are inserted other sensors to detect some external states as Wind speed, temperature, humidity...etc.

It has to be say, maybe shall we develop and upgrade some other functions on the Breadboard, which actually aren't there, but in the future could be the backbone of another different system. By means the serial port interconnected to Tibbo board, will decode any other command, simply upgrading this command on the source program code and re-assembling it.



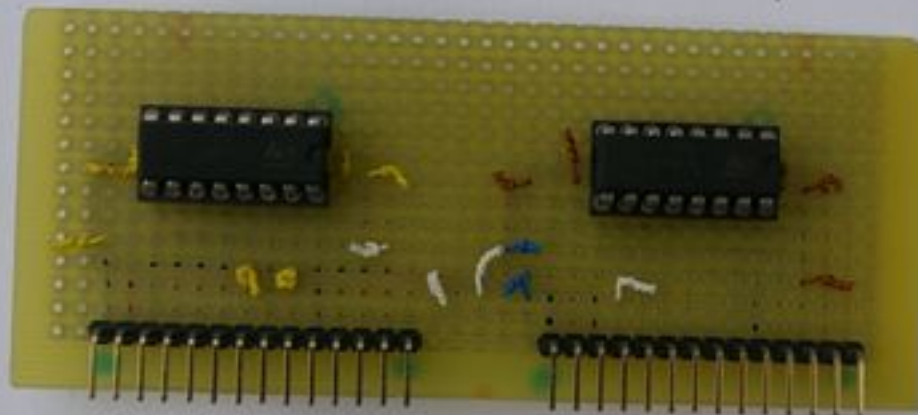
The Breadboard with Motor Driver Board and Stepper motor, without the TIBBO board

Atmel ATMEGA128
microprocessor

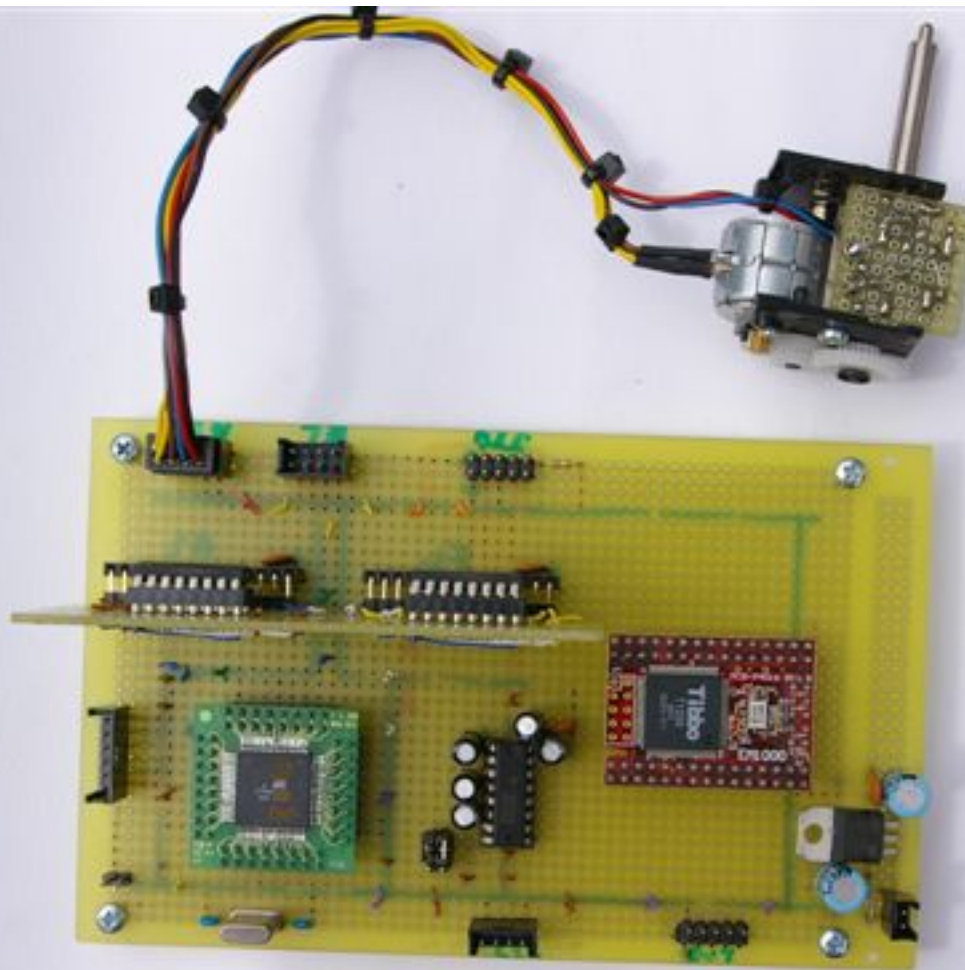


The Remote Control
for
Ham Radio use
IK5NTH - 12

MOTOR DRIVERS Board

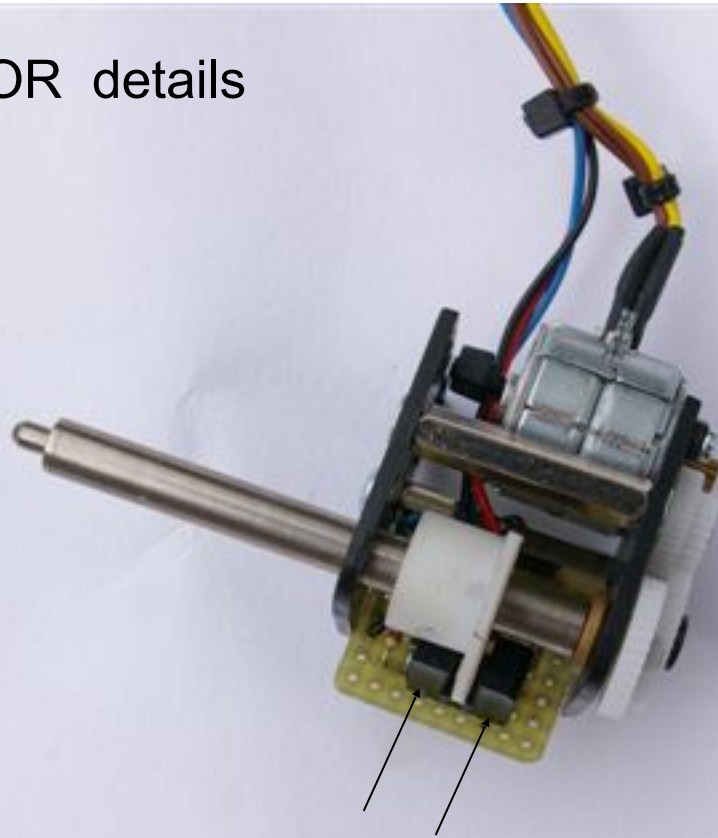


Complete Breadboard with Motor Drivers board and Stepper motor, and TIBBO board



The Remote Control
for
Ham Radio use
IK5NTH - 14

MOTOR details



EXPANSIONS
TX LED AND
OPTICAL DETECTOR

The Remote Control
for
Ham Radio use
IK5NTH - 15

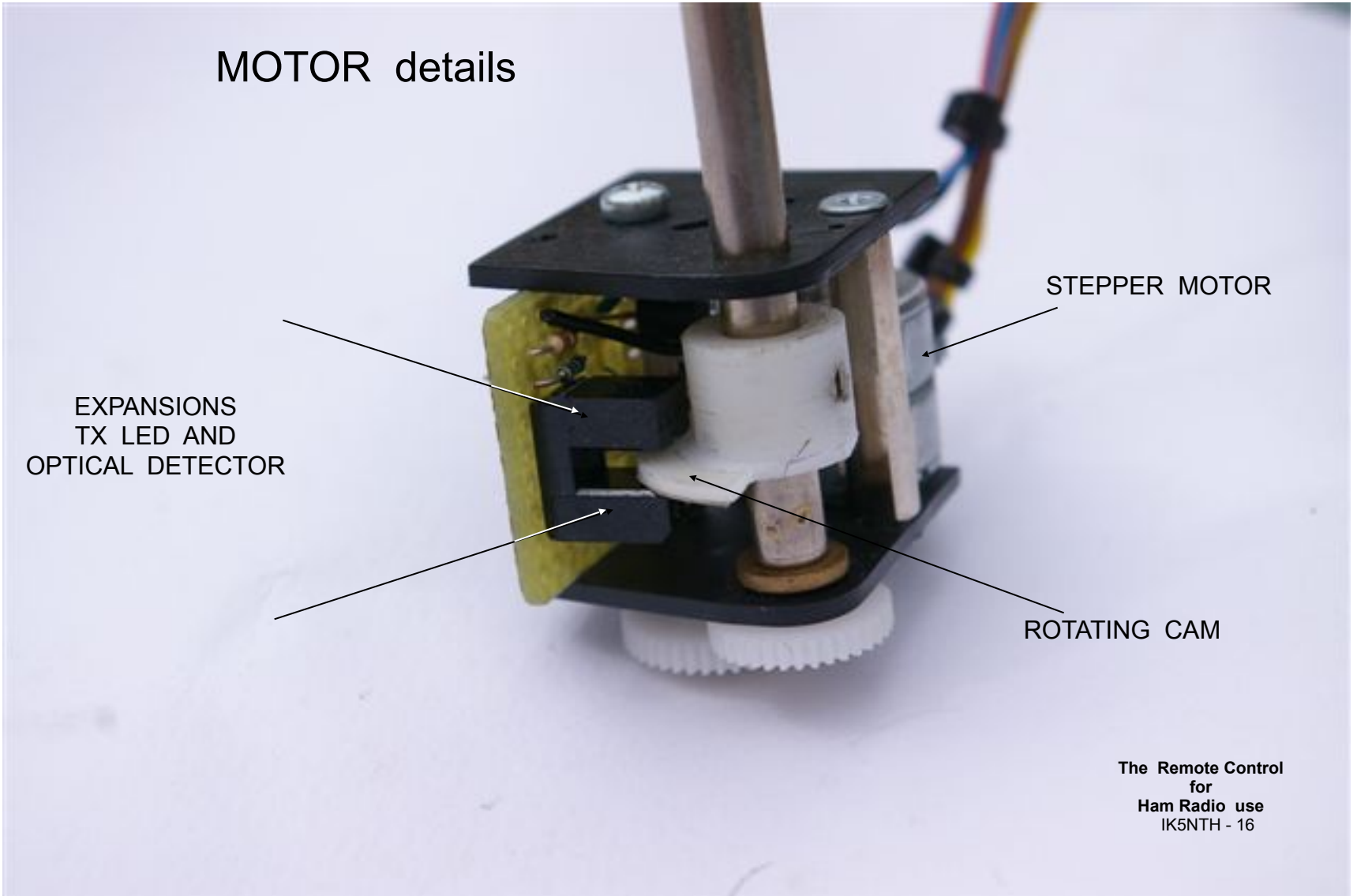
MOTOR details

EXPANSIONS
TX LED AND
OPTICAL DETECTOR

STEPPER MOTOR

ROTATING CAM

The Remote Control
for
Ham Radio use
IK5NTH - 16



DEMO WEB PAGE - INITIAL MASK

Connecting the remote TIBBO Web Server
the Web Page
prompt

UserName and Password



The screenshot shows a web page with a light blue border. At the top is a light blue header bar. Below it, the title "Remote Web Control" is displayed in large, bold, red font. Underneath the title, "Ham-Radio Station" is written in a smaller, bold, blue font. There are two input fields: "UserName" followed by a text box, and "Password" followed by a text box. Below these fields are two buttons: "Invia" and "reset". At the bottom of the page is another light blue footer bar.

The Remote Control
for
Ham Radio use
IK5NTH - 17

DEMO WEB PAGE - REMOTE CONTROLS MASK

This is my example of the web page. Every commands are sent clicking the mouse's buttons. You will have a visual feedback of the status about all relays or motor you have in the remote site.

Controlli Remoti



Catodica



Alta Tens.



Tx/Rx



Preamp.



Illumin.



Vox



Allarme



(riserva)

Temp.	1.23456	°C
Wind	12.34567	m/sec.
Humid.	123.45677947998046875	%
ENTER		

The Remote Control
for
Ham Radio use
IK5NTH - 18

INTERNET and relative problematics

We have seen the design of remote system breadboard. Let's have a look to the local site and connection's method by Internet to reach the remote board. There is a PC with an internal browser able to connect an IP address of the Network. By the Internet connection the browser engages a handshake protocol with the Tibbo Board which asks the internal web pages and which give the operator's Commands.

The main problem comes out due to the dynamic assignment of IP addresses. The quantity of telecomms agreements ADSL-Internet with many different Italian providers, bound a single user to own's ADSL provider and to his dynamic assignment of IP address.

Shurely, every time we attempt to connect we are assigned to a different IP address.

The embedded TIBBO Web Server requires a use of predefined IP address.

Therefore will be possible ward off to this problem by means a previous registration to many network services (dyndns.com) to join an "ALIAS" to IP actually assigned from this network service provider (opportunely chosen from which it's joint).

This service are normally free of charge.

To connect with our remote station we could digit on the "addresses bar" of our PC browser the "ALIAS" to obtain directly the connection.



Other Web Server solutions

On the market are available some other devices alternative to Web Server able to engage a connection with a remote IP address, without the use of HTML pages.

These products are the **Serial-to-Ethernet** converter devices.

His target consists to re-addressing into the network toward the defined IP address everything have source from a serial port. We could utilize this converter to connect a remote equipment simply to a TTY terminal; e.g.: the Windows Hyper-Terminal.

So as manner the Hyper-Terminal commands shall join the remote interface board (as in our example) without carry on the Web Server.

The remote interface board should be able to decode these commands and manage our own I/O commands. This would be another solution too.



Other available resources

The TIBBO Technology is ready to help another board to connect to Web Server which dispose on board an “**WI-FI Access Point**” based on 802.11b protocol, and in next release over the 802.11g protocol. With this system will be possible to acced to remote Web Server via Radio Link (over the radio field of action allowed to 802.11g protocol) to eliminate, when possible, the LAN cables too.

References

Tibbo Technology (www.tibbo.com)

Web-Sever EM1000

Wi-Fi Module WA1000



Our final target will be to made a simple web interface able to work without a PC,to switch on and off the transceiver, converter, remote PC, read the battery's voltage and current, rotate the antenna, measure the forward and reverse power , all this in a Xxxxxx Kmeters site far from where we are.

We are working to emulate and increase the capability of a product we can find in the market but very expensive: WEBREM



The Remote Control
for
Ham Radio use
IK5NTH - 19

Titus Technological Laboratories

WEBREM WR-400 Eight Channel Remote Control

METERS

TX 1 EP	TX1 IP	Ant I	TX POWER
0.000 V	0.000 V	0.000 V	0.000 V

STATUS

Tx 1 ON	Tx 2 ON	PWR DWN	Door OPN	WTR LOW	ANT DAY	ANT Night	Pwr LOW
☐	☐	☐	☐	☐	☐	☐	☐

CONTROL

TX 1 ON	TX 2 ON	TX 1 to DM	TX 2 to DM	FANS	Two Way	RMT BDCST	Rotor PWR
☐	☐	☐	☐	☐	☐	☐	☐

Latching Closure

☐	☐	☐	☐	☐	☐	☐	☐
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Momentary Closure

☐	☐	☐	☐	☐	☐	☐	☐
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Site Temperature: 78° F

[Click HERE to set labels.](#)

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4 analog display
Example:
Pwr forward
Power reverse
Battery voltage
Battery current

On/Off status
Example:
PC on/off
Transceiver on/off
Linear amp on/off
Ant turning left/right

Command Keyboard
Could be latching
or momentary

**This is the PC interface
of WEBREM.**

The Remote Control
for
Ham Radio use
IK5NTH - 22

OK, many thanks for your attention.

We are still working to have the possibility of sharing with you this project and to be able to realize a Kit or preassembled units for the Radio Amateurs use.

Please, your questions and suggestions are welcomed and will help us to better realize the Remote Controller.

It's your time!

